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ABSTRACT

In order for prospective teachers to become aware of the consequences of their actions and behaviors and to become more reflective about their teaching and their role as teachers, teacher education programs must incorporate interventions that allow novice teachers to become actively involved in the process of applying the theory of teaching to the practice of teaching. To facilitate this process, an interactive videodisc program was introduced into one section of an introduction to education course at Southern Illinois University at Carbondale (Illinois). The project was based on three constructs of learning: situated cognition, anchored instruction, and reflective judgment. The protocols consisted of videotaped recordings, made in local primary and middle school classrooms and later transferred to videodisc, of original and unrehearsed classroom sequences or related school events. To assess the effectiveness of the project, data were collected from pre- and post-tests, student logs, progress reports, and interviews with the 14 student participants. The data seem to indicate that the interactive videodisc project was a success in improving students' ability to analyze critical classroom events. Students perceived that the interactive videodiscs made them more reflective in their analysis of classroom life. (IAH)

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UTILIZING VIDEO PROTOCOLS TO ENHANCE TEACHER REFLECTIVE THINKING

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UTILIZING VIDEO PROTOCOLS TO ENHANCE TEACHER REFLECTIVE THINKING

Ask any teacher, "How did you learn to teach?," and the response will invariably be "by teaching." Implicit acknowledgement is given to the premise that actions and performance can be learned by or through experience; but there is little understanding of how this comes about. Teacher educators seem to rely on the premise that propositional knowledge from lectures and books can be translated directly into practice. Even as relevant information about effective ways of teaching emerge from research, methods of disseminating and applying the concepts at the classroom level remain unchanged.

According to a recent NCRTL Special Report (Spring 1991, pp. 6-9), prospective and practicing teachers' views about the nature of schools, the content of subjects, the teachers' role in facilitating learning, and related pedagogical implications are rooted in their past experiences. These experiences dating from the individual's earliest encounters with learning in formal and informal contexts, form an invisible network of a priori beliefs that shape and color the way prospective and experienced teachers think about and practice teaching.

Since individuals entering a teacher preparation program already have an educational history (Lortie, 1975), learning a new technique consists of reframing knowledge which is already there. Much of that knowledge is based in folkways, that is patterns of action and interpretation that are existent, considered right, mostly uncodified, and capable of being practiced without understanding their point or efficacy (Buchmann, 1987). This "wisdom of practice," often referred to as practical knowledge, draws on many sources including personal experience, organizational and resource constraints, time, money, and expertise.

If actors are aware of the beliefs and assumptions underlying their actions, they are more likely to recognize why their theories lead to consequences they did or did not want or could not explicitly espouse. Such reflection also can have moral consequences at the highest levels (Kitchener & King, 1990).

Review of Similar Projects

Brooks and Kopp (1991) reviewed 72 studies regarding the use of technological enhancement of preservice teacher preparation. Most of those studies were conducted during the 1970's about the effects of microteaching. Two studies reported the use of interactive videodisc technology to enhance teacher preparation in reading (Azbell, 1988) and classroom discipline (Evans, 1988). No studies were reported which used interactive videodisc technology to enhance preservice teacher awareness and knowledge at the beginning field experience level. Brooks and Kopp (1991) suggested a need for an interactive videodisc program that would counter negative aspects of field observation, particularly "untrained eyes and selective memories" that permit novices "to see what they want to see" (Brooks & Kopp, 1991, p. 500; Mischel, 1964). Included among the many specific suggestions for using technological enhancement in teacher education is the creation of unerasable video protocols of critical classroom events that would help preservice teachers begin to anticipate the range of problems and constraints that occur daily in classrooms. Using an interactive videodisc program, a novice could analyze (on campus) a typical classroom but have the benefits "of rewind, pause, volume control, laser pointer, instructors' insight and group discussion" (Brooks & Kopp, 1991, p. 502). This system would permit preservice students to enter data, make, and compare decisions without the constraints usually found during field experiences.

Approaches presently under development similar to our project include The University of Minnesota (Duluth), Cleveland State University, Iowa State University, and Indiana State University. These institutions have developed interactive videodisc materials for their elementary education programs. The focus of these programs is training in specific teaching strategy rather than the development of critical thinking involved in reflective judgement.

Nitschke (Watkins, 1991) describes the use of a computer network, Behavioral Research and Interactive Network (BRAIN) for students in the introductory psychology course at Luther College. During one class period, students conduct an experiment, analyze data, and discuss results. One experiment shows students that moral judgements may vary depending on the context

in which they are made. Student teachers at Marywood College use interactive video to hone management skills (Watkins, 1991). They are shown one of 18 vignettes and asked to choose the appropriate response. If the student's choice is inappropriate, the computer says so and the student pushes a key to see the appropriate response. Indiana State University has developed a series of interactive videodiscs for education, business, and industry (Summers, 1990-91). The purpose for the students, however, is to learn the process and merits of interactive video rather than as a teaching tool in education.

Background of Project

If prospective teachers are to become more cognizant of the consequences of their actions and behaviors and are to become more reflective about their teaching and their role as teachers, specially designed interventions must be incorporated into teacher education programs which allow novice teachers to become actively involved in the process of applying the *theory* of teaching to the *practice* of teaching. Traditionally, field experiences, including student teaching, have been the main vehicle utilized by teacher preparation programs to link theory and practice. However, many teacher educators now question the use of field experiences as the sole link. In order to facilitate this process, the researchers introduced the utilization of an interactive videodisc program into one section of Education 310, an introduction to education course at Southern Illinois University at Carbondale. We believe that the incorporation of interactive videodiscs can significantly alter the methods by which prospective teachers are educated. Although videotape has become the media choice in teacher education programs nationwide (Brooks & Kopp, 1991), interactive videodisc extends the power of the video medium because it offers the design advantages of flexibility, unlimited opportunities to observe, interpret, diagnose, and review the same episodes, stimulates the learner, and, as reported in recent research, increases content knowledge and observation skills (Carlson & Falk, 1990-91).

The project was based on three constructs of learning: situated cognition, anchored instruction, and reflective judgement. Situated cognition implies that knowledge is situated, being in part a product of the activity content and culture in which it is developed and used (Brown,

Collins, & Duquid, 1989). Embedding learning in an activity, in this case, the interactive video teaching episode, makes deliberate use of the social and physical context surrounding the event (classroom management and discipline) and is more in line with the understanding of learning and cognition that is emerging from research.

Typically, novice teachers learn about teaching behaviors and strategies through the use of lectures and textbooks. Thus, teachers acquire semantic knowledge by learning rules and steps to implementing a strategy. Interactive video allows teacher behaviors to be taught as procedural knowledge rather than semantic knowledge (Berliner, 1986). The situations featured in the interactive video *co* -produce knowledge through the activity so that the novice teacher learns about and practices classroom management, for example, by participating in the interactive process.

Anchored instruction is instruction that is based in an activity meaningful to the students (The Cognition and Technology Group at Vanderbilt, 1990). The major goal of anchored instruction is to overcome the problem of semantic knowledge. Semantic knowledge is knowledge often learned outside of the ordinary practices of the culture (school classrooms). Semantic knowledge can be recalled when a person is asked to do so, but is not utilized spontaneously in problem-solving events. When students learn new information in the context of meaningful activities (interactive episodes), they are more likely to perceive the new information as a tool for future classroom situations rather than as an arbitrary set of procedures or facts. Anchored instruction in the interactive mode has the potential to be more effective than many experiences that typically occur in teacher education because it can compress time (hours and days can be compressed into minutes) and it allows the novice teacher to revisit episodes.

The final construct in which this project was based is reflective judgement, the shifts that occur in a person's assumptions about certain areas of knowledge and in the way a person justifies his or her beliefs or decisions (Kitchener & King, 1990). Novice teachers typically do not receive much opportunity for developing reflective judgement regarding the complex problems that are part of the daily classroom routine until they are immersed in student teaching. Their judgements are based on reactions developed through years of experience as students and on their own in individual

belief systems. The interactive video program provides opportunities for the novice teachers to interpret, make decisions, and compare their process with other novice teachers and instructors. The use of technology may facilitate learning by providing rich problem-solving contexts that invite thinking and by developing fluent access to knowledge and skills (Bransford et al, 1988). Berliner (1986) believes that if teacher preparation becomes a more laboratory oriented process, new norms about the nature of teaching would develop so that teachers would be more analytic and practical in their approach to teaching. Rather than producing teachers who teach as they were taught and who base their instruction on textbooks, this project encourages the development of teachers who have a richer understanding of the teaching context and who employ reflective judgement in approaching their teaching practices.

In traditional teacher education programs, novice teachers first encounter classroom events in contrived simulations with peers or during student teaching in actual classrooms. In the former, the novice teacher is dealing with contrived events and peers acting as "real" students. In the latter, the novice teacher often must react to a "live" classroom event without prior reflection and with very real consequences.

Description of the Project

The goals of the project were to:

(1) enhance novice teachers' recognition of significant classroom events,

(2) provide novice teachers practice in making justified decisions in responding to significant classroom events and provide feedback about their decisions, and

(3) improve novice teachers' understanding and use of theoretical knowledge (appropriate professional language; that is, terms, definitions, concepts, cause and effect statements, facts, and laws) used in describing classroom events.

The delivery system for the project consists of an interactive videodisc program incorporating the protocol materials, a text (Posner, 1989), 13 one-half day field observations in one of SIU-C's Teacher Education Centers, and 4 two-hour on-campus classes. The other sections of this course did not incorporate the interactive videodisc project into their classes.

Protocol materials consist of two parts: protocols and materials. The protocols are videotaped recordings of original and unrehearsed classroom sequences or school related events. The recordings were made in local primary and middle school classrooms. The classroom sequences and events were selectively edited for significant examples relevant to the theoretical knowledge presented in the text and for technical quality, clarity, and length. These protocols were transferred from videotape to videodisc.

The materials are organized collections of relevant theoretical knowledge (concepts, definitions, facts, conditional propositions, and laws). They include the text, computer text screens, and videotaped identification and explanations of the significant events in the protocols by members of the SIU-C Teacher Education faculty and the teachers appearing in the protocols. Faculty viewed the edited protocols and responded in videotaped interviews elaborating on underlying theoretical events in the protocols. The taped responses were transferred onto the videodisc and made accessible to the learner through a pull-down menu during use of the interactive videodisc program.

The teachers appearing in the protocols were interviewed using a stimulated recall technique to help them further elaborate on the actions, thoughts, and decisions during the classroom events. In another menu option, the learner may view the protocol again after seeing and hearing the teacher's explanations of the event. A freeze frame technique with video inset of the teachers' interview responses is used at significant points in the protocol.

Relevant theoretical knowledge from sources other than the text was scanned into the computer program and made available to the learner via a menu option. This material presents alternative perspectives on the events in the protocols drawn from recent research.

Methods

During the first week of classes, the fourteen participants viewed a selected, videotaped protocol and responded in writing to questions about the significant events in the protocol. This pre-assessment was designed to establish a benchmark for students' recognition of educationally significant events and the competence of their responses to the events at the beginning of the

semester. The final exam given at the end of the 16 week semester consisted of the same video protocol and questions. It was expected that there would be an increase in the number of educationally significant events identified and in-depth analysis of those events. At the conclusion of the semester, the Education 310 students were interviewed to obtain their perceptions of the interactive videodisc project.

In order to assess the effectiveness of the interactive videodisc project, data was collected from multiple sources: pre- and post- tests, students logs and progress reports, and student interviews. Students viewed the interactive videodisc program as both a pre- and post-test. The post-test was completed approximately 16 weeks after the pre-test. Students were asked a series of questions that focused on their perceptions of and reactions to the significant events contained on the disc. During the post-test, students had access to the interviews with the "experts" and the teachers.

Results

One of the methods utilized to assess the pre- and post-tests was a word count. The data revealed that in 12 of 13 cases the total word count increased from the pre- to post-test. The average total word count for the pre-test was 634 while for the post-test, it was 860. The pre-test contained twice as many simple declarative statements as the post-test. An example of this difference is:

Pre-test example: She walks around the classroom and stands next to the student talking.

Post-test example: When she is standing behind the student who is talking, she is drawing the class's attention to that student.

The reasons for the more complex statements during the post-test may include: (1) an increased use of specific examples and details, (2) increased use of supporting evidence for claims, (3) more detail in descriptions, (4) more use of generalizations from the specific incident to the broader arena of education, (5) a pattern of explanations for the teacher's actions, and (6) students may have become better at observation.

Students were required to write a log for each of their 13 visits to the school classroom and

also a progress report at the conclusion of the semester. Both the logs and the progress reports were read for any unsolicited statements pertaining to the interactive videodisc component of the class. The following statements are examples of students' reactions to the interactive videodiscs:

Student #1: "The interactive video was a great learning tool. The way it is presented makes it very meaningful to the student. The videos are a good way to explore a variety of learning situations and the various learning styles of the experienced teachers. The comments of the experts and the teachers' justification for their actions were very informative and interesting."

Student #2: "I feel as though I am more reflective now compared to the beginning of the semester. I have begun to notice things within the classroom that I would have never noticed if I wasn't made aware of them. Posner has been helpful, however the videos we have been watching have been more effective for me. Seeing a video of a classroom is the next best thing to being there. I also find it helpful to discuss the videos with other people. I can watch something a hundred times and not notice something that someone else notices. Sharing with other individuals contributes vast amounts of experiences to base learning on. I found this extremely helpful."

The final means for assessing the interactive videodisc project was an interview conducted with individual students at the conclusion of the semester. Of the 16 students interviewed, all but two students were positive about the interactive videodisc component of the course. The two negative responses evolved from students who were completing their Education 310 field experience in high school classrooms and who were not able to relate to the videodisc examples of the elementary and junior high school classrooms.

The positive comments from the remaining 14 students focused on a variety of variables. First, students appreciated being able to observe additional classrooms and to observe other teachers' approaches to students and learning. Second, students responded favorably to being able to return to portions of the recorded classrooms for additional observation and reflection of a critical event. Third, students found the teachers' recollections of and reflections about the critical classroom events to be very helpful. Many students commented that this segment of the program

helped them to view the critical event in a different light and that there might be a variety of approaches to a single incident. Fourth, the students strongly believed that they were receiving a positive teaching/learning experience that students in the other sections of Education 310 were not receiving. Fifth, the students believed that the interactive videodisc project facilitated their ability to become more reflective.

Conclusion

The data seem to indicate that the interactive videodisc project was a success in many ways. Students appeared to be more descriptive in their analysis of critical classroom events and able to use more evidence in supporting their claims. Students' interviews also revealed that they perceived the interactive videodiscs to make them more reflective in their analysis of classroom life. Perhaps just as important, the students believed that they were receiving a positive experience that other students were not receiving in their class. It does appear that the students' abilities to reflect on classroom events improved during the semester but, at this point, we have been unable to verify quantitatively if this improvement is a result of the interactive videodisc project.

Current efforts of the interactive videodisc project include the development of a more sophisticated interactive system, the addition of high school classrooms, and the development of a more sophisticated assessment process.

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